

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application. Please cancel claims 23-24 and amend claims 1, 11, and 15.

Claim 1 (currently amended): A method for simultaneously determining multiple individual chemical concentrations of an undiluted liquid kraft liquor stream comprising:

providing [[a]] an undiluted liquid kraft liquor stream;

subjecting at least a segment of the stream to ultraviolet light wherein the light penetrates a short distance into the segment and the effective path length of the light is a function of the refractive index of the segment;

generating an ultraviolet absorption spectrum from the ultraviolet penetration of the sample over a wavelength from 190 to 300 nm; and

analyzing the ultraviolet absorption spectrum by a regression method to determine the multiple component concentrations of the liquid stream;
wherein the sample is subjected to ultraviolet light by an attenuated total reflectance device.

Claim 2 (previously presented): A method according to claim 1 wherein the attenuated total reflectance device is an ATR-UV optical probe.

Claim 3 (previously presented): A method according to claim 1 wherein the attenuated total reflectance device is an ATR-UV tunnel flow cell.

Claim 4 (original): A method according to claim 1 wherein the regression method is multivariate.

Claim 5 (original): A method according to claim 4 wherein the multivariate regression method is the partial least squares method.

Claim 6 (original): A method according to claim 1 wherein the regression method is linear.

Claim 7 (canceled).

Claim 8 (previously presented): A method according to claim 1 wherein the measured individual chemical concentrations of the kraft liquor are selected from sodium hydroxide, sodium sulfide, and sodium carbonate.

Claim 9 (previously presented): A method for simultaneously determining the sodium hydroxide, sodium sulfide, and sodium carbonate concentrations of a kraft liquor stream comprising:

providing a kraft liquor stream;

generating an ATR-UV absorbency spectrum of the liquor over a wavelength of 190 to 300 nm;

analyzing the ultraviolet absorption spectrum by a regression method to determine the concentrations of sodium hydroxide, sodium sulfide, and sodium carbonate in the kraft liquor stream.

Claim 10 (previously presented): A method according to claim 9, further comprising controlling operation of a kraft cooking digester recausticizing unit, white liquor oxidization reactor or chemical recovery furnace in response to the determined sodium hydroxide, sodium sulfide, and sodium carbonate concentrations.

Claim 11 (currently amended): A system for simultaneously determining multiple individual chemical concentrations of a liquid kraft pulp stream comprising: [[a]] an undiluted liquid kraft [[pulp]] liquor stream source, an ultraviolet spectrophotometer in cooperative relationship with a device in direct communication with the undiluted liquid kraft liquor stream and capable of providing ultraviolet absorption data between 190 and 300 nm from the undiluted liquid kraft liquor stream, and a multivariate or linear calibration program for analyzing the provided ultraviolet absorption data, wherein the device is an attenuated total reflectance device.

Claim 12 (previously presented): A system according to claim 11 wherein the attenuated total reflectance device is an ATR-UV optical probe.

Claim 13 (canceled).

Claim 14 (previously presented): A system according to claim 11 wherein the attenuated total reflectance device is an ATR-UV tunnel flow cell.

Claim 15 (currently amended): A system according to claim 14 wherein the ATR-UV tunnel flow cell is installed in the ultraviolet spectrometer and [[a]] the liquid kraft pulp stream flows through the ATR-UV tunnel flow cell.

Claim 16 (previously presented): A system for determining chemical concentrations of NaOH and Na₂CO₃ in a kraft liquor stream comprising:

an ultraviolet spectrometer,

an attenuated total reflectance device capable of providing ultraviolet absorption data between 190 and 300 nm wherein the attenuated total reflectance device transmits the ultraviolet absorption data to the ultraviolet spectrometer by fiber optic cable, and

a multivariate or linear calibration program for analyzing the ultraviolet absorption data.

Claim 17 (previously presented): A system according to claim 16 wherein the attenuated total reflectance device is an ATR-UV optical probe installed in a kraft liquor stream.

Claim 18 (previously presented): A system according to claim 16 wherein the attenuated total reflectance device is an ATR-UV tunnel flow cell installed in the

ultraviolet spectrometer and a kraft liquor stream flows through the ATR-UV tunnel flow cell.

Claim 19 (previously presented): The system according to claim 18, wherein the ATR-UV tunnel flow cell comprises a pump and the kraft liquor stream is pumped through the ATR-UV tunnel flow cell.

Claim 20 (previously presented): The system according to claim 15, wherein the ATR-UV tunnel flow cell comprises a pump and the liquid kraft pulp stream is pumped through the ATR-UV tunnel flow cell.

Claim 21 (previously presented): The system according to claim 18, further comprising a light source which directs light through the ATR-UV tunnel flow cell to the ultraviolet spectrometer.

Claim 22 (previously presented): The system according to claim 15, further comprising a light source which directs light through the ATR-UV tunnel flow cell to the ultraviolet spectrometer.

Claims 23-24 (canceled).